Vol III No 4

THE P·T·REVIEW

PUBLISHED QUARTERLY BY
THE AMERICAN PHYSIOTHERAPY ASSOCIATION
December, 1923

Regulation Physiotherapy Uniforms

Dark Blue with White Collar and Cuffs

For Service in U. S. Government

Made to Order of Thoroughly Shrunken Goods

Send for Measurement Blank

We make Nurses' Uniforms in Many Styles of All the Popular Materials

The Uniform Shop

Tel. Back Bay 5067 **739 Boylston St. - Boston, Mass.**

Read Our "Ads" Carefully

These Firms are the Best, Specializing in P. T. Equipment

OFFICERS AND EXECUTIVE COMMITTEE
Of the A. P. A. for 1923-24

President

Inga Lohne	142 Davis Ave., Brookline, Mass.

Vice-Presidents

Dorothea Beck	Orthopedic Hospital, Orange, N. J.
Lily Graham	Children's Hospital, Sunset Blvd., Los Angeles, Cal.

Treasurer

Janet B. Merrill	300 Longwood Ave., Boston, Mass.

Secretary

Winifred Tougas	9 Bellingham St., Newton Highlands, Mass.

Executive Committee

Clara Eisenbrey	1977 E. 97th St., Cleveland, Ohio.
Leah Thomas	Smith College, Northampton, Mass.

EDITORIAL STAFF

Editor-in-Chief

Elizabeth Wells	46 Waverly St., Brookline, Mass.

Associate Editor

Juanita Metherall	142 Berkeley St., Boston, Mass.

Circulation Manager

Winifred Tougas	9 Bellingham St., Newton Highlands, Mass.

Business and Advertising Manager

Thomas Burns	419 Boylston St., Boston, Mass.

Advertising Assistant

Louise Robinson	P. H. S. No. 30, Chicago, Ill.

Contributing Editors

Leah Thomas	Smith College, Northampton, Mass.
Margaret Blake	Johnston-Wickett Clinic, Anaheim, Cal.
Eleanor Fisher	U. S. V. H., No. 92 Jefferson Barracks, Mo.
Emma Vogel	Ward 76, Walter Reed, Washington, D. C.
Marion Sweetser	611 So. Burlington St., Los Angeles, Cal.
Hazel Furscott	240 Stockton St., San Francisco, Cal.
Emily Wellington	V. B., Grand Central Palace, New York, N. Y.
Lillian Gleason	1895 E. 93d St., Cleveland, Ohio.

IMPORTANT NOTICE

The P. T. Review is published quarterly by the American Physiotherapy Association. Membership includes the Review, but subscription may be obtained by sending two dollars ($2.00) to the *Circulation Manager.*

All material for the Review must be sent to the *Editor-in-Chief* by the first day of May, August, November, February.

For advertising rates address the *Advertising Manager.*

Editorial

Abstract from a letter to the Secretary from one of our subscribers:

"The P. T. REVIEW received. I like it, but don't see how you can afford to publish it for one dollar. The dollar is so weak in purchasing power at the present time.

"I think that if all the P. T.s were willing to boost this baby magazine until it is able to walk alone, it would repay all of us. I would suggest doubling the price. I am ready to do so on notification."

The Editors appreciate a letter like this, especially now, as the Treasurer has sent word that many of our members are not paying their dues, and that the Association will be a thing of the past if the P. T.s who have been members drop out and others who can qualify for membership just subscribe to the P. T. REVIEW instead of joining as members and help to push the load.

Think it over, P. T.s. The Association is here to serve you, the REVIEW is yours forever if you want it, but neither can thrive unless they are fed by the loyalty, interest and dues from a united group of P. T.s throughout this great country of ours.

DEAR MEMBERS:

I am using this medium to say "Thank you," to those enthusiastic members on the west coast who outdid themselves in hospitality and courtesy at the time of the convention in San Francisco, and afterwards during my stay on the coast.

It was a great boost to me to find the high standards established by the P. T.s, and the co-operation of the Medical Profession is surely unequalled.

I visited workers at hospitals, in private offices, and at the industrial centers in San Francisco, Oakland, Los Angeles, Portland and Seattle. Wherever I went, I was met by the greatest enthusiasm and interest. I came east feeling that besides having

had a wonderful trip scenically and socially, I had also gained invaluable help professionally.

I hope our next convention will be as successful as our last one, and will bring forth members from every section of the country. In unity lies strength; it is only by getting together to talk over our problems and build up our standards that we can grow into useful organizations in our communities.

Plan now to take a week or ten days' leave early in June and come to Chicago to give to others what you have gained in methods, etc., and receive inspiration to carry on.

Fraternally yours,

INGA LOHNE.

Here and There

Elizabeth L. Wells, our Editor-in-Chief, is at the Philadelphia Orthopedic Hospital, taking a post graduate course in Physiotherapy.

Marjorie Bullock has opened an X-ray and Electrotherapy office at The Checkerton, Brockton, Mass.

Mr. and Mrs. George H. Vinall (Grace Archibald), are receiving congratulations upon the birth of a son, Philip Henry, on October 25th, Portland, Maine.

A son, Sanderson, was born to Lieutenant Commander and Mrs. H. Travis Smith (Marguerite Sanderson), on November 6th, Brookline, Mass.

Physiotherapists in the state of Washington have organized an association and desire that each member become a member of the National Association. Address Miss K. M. Pegran, Secretary-Treasurer, Children's Orthopedic Hospital, Warren Ave., Seattle, Washington.

New Members

Lillian Barrett, Walter Reed Hospital, Washington, D. C.
Ernestine Parker, 38 Otis Street, Melrose, Mass.

Physiotherapy in Relation to Orthopaedic Problems of Shoulder Girdle and Arm*

DR. C. LEROY LOWMAN, Los Angeles, Cal.

AS orthopaedic surgery in its corrective phase deals with problems of abnormal mechanics, the success of the therapeutic measures used is dependent on a knowledge of abnormal factors, both anatomical and physiological. In the development of physical educational methods, normal kinesiology is given a prominent place, but as yet no accurate work on abnormal kinesiology has been published. Consequently it is difficult for any one needing specific information to obtain it without much effort in culling over available literature.

Many articles have been written, and some books have been published on the work of reconstruction and rehabilitation of those injured in the war and in industries, but they deal chiefly with the description of methods and apparatus, and do not specifically state just what changes have taken place in a given injured member, exactly what the orthopaedic need is for its correction, nor what specific physiotherapeutic measures should be used to accomplish that correction.

Not only must we know when, but where and how, each physiotherapeutic step must be taken. Sequence, duration and progression must be definite prescriptive matters and ought not to be passed over by so general a prescription as "massage and exercises," or "exercise and hydrotherapy."

It is hoped that the coming generation of medical students will be taught the therapeutic use of at least the simpler forms of remedial movements and massage, and the indications and contraindications for their use, just as they are taught the therapeutic action of various forms of drugs. There is the same need in regard to hydro, electro, and mechano-therapeutics and corrective gymnastics.

It is the hope of the writer that the discussion of some specific instances will be of help to those needing advice or suggestion in the

---

* Paper read at the second annual convention of the A. P. A. and the annual convention of the California Association of Physiotherapists, San Francisco, Cal., June 23, 1923.

Reprinted by permission of the California Medical Association Branch of Technical Specialties.

handling of similar cases. In order to be specific and as a convenient point of beginning, let us consider certain affections and injuries of the shoulder girdle and arm. The principles involved can be applied to the consideration of similar lesions in other parts of the body; the questions regarding splinting being the only ones needing changes.

Those who are called upon to treat most commonly are:
Shoulder lesions:

A. Traumatic—Contusions, strains, sprains, dislocation, with or without.

1. Bursitis—Sub-scapular, sub-acromial, sub-deltoid, sub-coracoid.

2. Traumatic or postural arthritis of—Shoulder joint, Acromio-clavicular joint.

3. Neuritis—Brachial Plexus, spinal accessory, circumphlex distribution.

4. With wounds or burns involving upper arm, shoulder, shoulder girdle, complicated by contractures, cicatrices, loss of substance, loss of joint (flail or arthrodesis), secondary changes in lower arm below injury; trophic-circulatory, neural, bone, joint neural paralysis, partial, total.

B. Paralytic—Spastic, cerebral palsies; flaccid, poliomyelitis.

C. Infections—

1. Arthrites—Septic with wounds, tubercular, chronic infectious hypertrophic, osteo arthritis, atrophic arthritis, acute infectious.

2. Bursites (infectious) — Sub-scapular, sub-acromial, sub-deltoid, sub-coracoid.

TREATMENT CLASS A

Let us presume that the proper orthopaedic measures have been instituted to obtain fixed physiological rest in the functioning position, viz., abduction with slight rotation, elbow flexed and held in a plane on a level with the front of the chest, for a period ranging from ten days to six weeks as the severity indicated. If a plaster

shoulder spica has been used, it can in most cases have the top half removed and the lower portion kept in place as a retention splint.

Massage should begin as early as conditions will allow, starting with slow, light, sedative, upward movements above the affected area to empty the lymphatic channels, combined with deep tonic movements (petrissage) deep stripping, etc., on the hand and forearm, together with active-passive movements or all joints of hand, wrist and elbow. As soon as it can be safely done, the arm may be carefully lifted from the splint by an assistant and mild passive movements of the shoulder joint made, at first only once through the painless arc, in each direction permitted by the splint. The number of movements to be gradually increased and as soon as pain will permit to have the patient begin to aid actively.

To promote circulation in cases that have been retained longer in splints, baking with radiant light sufficient to establish a mild hyperaemia is useful before beginning massage for a period of from five to ten minutes' duration.

As the pain is decreased, the active elements of the treatments may be increased. At first the patient lifts the arm up as far as possible out of the splint, carrying it upward, forward, backward, and in rotation, coupling these with hand and arm movements. Later a little resistance is added and following the massage a cold towel rub, a mitten friction, or a salt rub; this will leave the part in a very much improved condition.

Within from two to five weeks the treatment should have progressed to the point of removal of the splint during the treatment, with the patient lying on his back and the arm supported on a pillow. The massage can now be made deeper and more tonic, except over the pectorals, latissimus dorsi and teres (the adductor group must not be stimulated). Alternate hot and cold fomentations of short duration may precede the massage with benefit.

It must be remembered that in all joint conditions care must be taken not to congest and engorge the soft tissues in and about the joint before giving active exercises, as this will promote interference with the mechanical function because of thickened, swollen linings; and physiological engorgement and congestion are as bad as pathological, from an exercise standpoint, regardless of how much the pain may be relieved by heat. The proper sequence should be mild baking, active movements and depleting massage and later, tonic

massage graduate resistive exercise, and hydroptherapy; the splint or sling to be reapplied after each treatment.

In arthritic and bursal condition the sedative phase of the treatment may require a little longer time, and the massage will approach the painful areas more slowly. Baking to the point of more marked hyperaemia, or short duration only will be beneficial, and may be decreased or discontinued as movements are begun.

In very painful cases, when the fixed splint can be removed, a hydro treatment, for instance; a Scotch douche, creating a local area of reaction in an adjacent part, as the lower back, after a mild electric cabinet bath of from five to ten minutes at moderate temperature will result in local improvement and will also give, by determining blood away from the congested area, a general sense of well-being. This is more especially applicable when there is a tendency to an arthritic diathesis, or old quiescent or chronic arthritic lesions in other joints. In cases with intestinal stasis and otherwise poor elimination, attention to the general systemic reactions is very helpful to the local lesion because the circulating blood is rendered less toxic and irritating.

A word in reference to the bursitis group. The maintenance of proper shoulder girdle alignment is essential and must be controlled between treatments or their effect will be greatly vitiated. Sometimes a figure-of-eight bandage is sufficient; in other cases shoulder straps affixed to the corset or a brace is needed. More severe acute cases may need a plaster cast for two or three weeks' actual rest, then to be followed by the treatment as outlined. Active corrective exercises must not be given in acute bursitis nor in subacute cases immediately following hot sedative hyperaemic treatments; nor within one or two weeks after the breaking up of adhesions in chronic cases. Single movements, passive or active, one in each direction to the maximum allowed by pain, are not to be construed as active exercises: by the latter are meant such activities as free arm gymnastics, with or without dumb-bells or Indian clubs, medicine balls, chest weights, etc. Whenever the condition has increased to the neuritic stage, the sedative and rest phases of the treatment should be prolonged.

In reference to cervico-dorsal and sub-occipital pain and neuritis, I wish to call attention to the fact that all activities requiring head and shoulder fixation, concentration strain, must be ruled out,

in many cases, before permanent results can be obtained. I have never seen this point mentioned, but it was brought out in some research work done by the author and an oculist, Dr. Lloyd Mills. The result of this work was reported by me in an article published in the American Journal of Orthopaedic Surgery, December, 1918, under the title, "The Effect of Faulty Spinal Alignment on Eye Conditions," and again more in detail in an article by Dr. Mills, published in the American Journal of Opthalmology.

Eye fixation for concentration of vision, as in reading, necessitates head fixation. This is accomplished by the cervical, shoulder and back muscles. Whenever hand work is added, as in writing, drawing, or in any occupational work, scapular fixation is also necessary, and the amount of muscular strain is greatly increased, without the patient realizing that "he has been doing anything." Inquiry as to what patients do between treatments will often enable one to find the reason for failure or slow progress.

Electrical treatments, such as high frequency, are often found to be beneficial in the neuritic stage of these injuries, as well as in neuritis of toxic origin. However, it must be remembered that often no type of treatment will avail if the question of posture and fixation strain is not taken into consideration. These facts must be remembered in treating all shoulder and upper back conditions, although they are more important in connection with neuritic and bursal lesions. Care must be taken that the work of occupational and curative therapy is not too taxing to begin with, because if it is, the time spent in physiotherapy may be lost by relapse or much prolonged by strain produced as mentioned above, which partially neutralizes the benefits gained from such treatment.

CLASS B. WOUNDS AND BURNS

It is the usual custom of the surgeon to allow no massage in the region of the wound or motion of the part. It has been one of the newer developments of war surgery, however, to make both active and passive movements of all joints adjacent to wounds of the soft structure. The healing of the wound is in no way interfered with by such movements, and the stiffening and matting together of muscle masses by deep scars and adhesions is prevented, thereby securing greatly improved function. Massage of the ex-

tremity distal to the lesion is always indicated, especially where wounds are sluggish; and should follow the massage above the area involved. This is physiologically sound. The stripping and depleting of the area above the wound has a suction action which increases the lymphatic and venous flow. The same is true in the area below, where the stasis is overcome and circulatory changes are promoted. This benefits the area of the lesion and overcomes trophic changes, especially those seen about the joints of the hands, which so commonly occur in all arm and shoulder conditions requiring disuse and immobilization. These facts also hold good in regard to the lower extremity. Very light, gentle manual movements even directly in the wound area can be carried on beneficially by one trained in careful technic.

Such massage may be a procedure which few would advocate. When patients must be handled or moved frequently, the surgeon may prefer to let Nature manage the overcoming of circulatory stasis. However, times are changing, and with trained technicians who can be trusted, better functional results will be obtained because methods based not on empiricism and the traditions of former years, but on sound physiological laws.

CONTRACTURES DESCRIBED UNDER CLASS C

Cicatrices from wounds and burns in the shoulder region present problems to overcome which requires the greatest patience and the best of treatment. They are especially aggravating when they occur on the under surface of the arm in the region of the axilla, or over the axillary margin of the scapula; and their treatment is particularly difficult when the arm has not been kept in abduction. Treatment here is aimed at softening and mobilizing the scar. This allows a greater range of motion and makes it possible further to overcome contractures of the deeper structures. The primary procedure is to obtain hyperaemia of the scar area by one of several measures. Radiant heat up to the point of redness may be used. Follow this by massage of the manual vibratory type with cautious petrissage around the margin. If the scar is very sensitive or extensive, immersion in a hot bath or applications of heat by means of hot compresses are useful in softening the fibrous masses. Occasionally electrical ionization with salt solution or thiosinamin will hasten this affect. In massaging scars we have some-

times used an ointment containing camphor, menthol, and thymol ten per cent of each. This prevents the abrasion of the delicate surface, and leaves a sensation of warmth, and prolongs the effect of the treatment. In scars of moderate size, the whole area may be grasped in the hand and gently moved up and down or back and forth, stretching the deeper adhesions to muscles and bones. As the cicatrix softens, active-passive movements increasing the muscular action, aid in mobilizing the shoulder joint, increase the range of scapular activity, and help in separating the muscle bundles which may be matted together. It is often advisable to keep up this active effort of stretching and mobilizing the tissues even when the surface of the scar occasionally breaks down, because of resulting nutritional improvement.

CLASS C. INJURIES TO SHOULDER AREA

In those cases complicated by fractures, the after treatment is made very difficult if the arm has not been held in abduction. The long fixation necessary predisposes contractures of the adductor muscles, if the arm is treated at an angle below forty-five degrees. Fractures of the scapula, distal end of the clavicle, and head of the humerus, or fracture dislocations, come out of the splints with varying degrees of stiffness and atrophy, marked interference with function, and often with severe pain and spasm on all attempt at motion.

Whenever possible, it is desirable to have the part treated in splints that allow an approach to all parts of the arm, shoulder and back. This allows early massage to be instituted whenever the condition or treatment of wounds permit.. If treated in plaster spica casts, the removal of the top section, part or all the way up the arm, will allow some massage. The hand and forearm should always have stimulating massage with upward stripping, and active and passive movement of all joints may be allowed. Early light tapotement or manual percussion over the fracture line is desirable if it is possible to get to it without disturbing the alignment, and if the wounds do not interfere. This treatment is especially desirable when there is slow or delayed union. As early as the surgeon can permit, the cast should be removed for treatment. If proper care is taken, an aide trained in handling these cases can safely remove the splints early without making any undue strain on the

soft callus. In removing shoulder and upper arm splints, the patient should be lying down, shoulder girdle supported by a pillow, and the arm supported by an assistant. He should then be carefully transferred to pillows without changing the alignment. The weight of the body on the scapulae maintains the proper position of the acromio-clavicular junction. This is especially desired in those cases where the injury involves either the scapula or clavicle, such as: fractures of the spine of the scapula, or acromial end of the clavicle, particularly its distal portion, and acromio-clavicular dislocations. This position is especially desirable when the time for active movement is reached. Increase of range of motion up to the point of the beginning of scapular movement can be obtained without risk to the healing area in the bones, and the improvement of muscle function has its correlative affect on subadjacent bony areas.

When complicated by a wound, active phases of the treatment must be used cautiously and should not be begun until infection has failed to develop or its thoroughly localized and stable union has occurred in the fractured bones. At this time very careful passive movements should be made for several days gradually adding active efforts to the passive. The guide as to the use of physiotherapy should always be the presence or absence of inflammatory reaction, such as increased sensitiveness around the wound, swelling, redness or pain on motion, or soreness persisting too long after the treatment and not entirely passing off by the following day. Any indication of such reaction calls for discontinuance of treatment of sufficient modification of it to keep from producing such an effect.

The needed modification may be the dropping back to massage only, or decreasing the number, duration, or frequency of movements. In old cases with chronic osteomyelitis such reactions may be evidence of the presence of a sequestrum which Nature desires to extrude.

With chronic sluggish surface wounds and no deep infection, the use of radiant light will often assist in hastening healing. Massage should be applied, first above and then below the area directly involved, approaching the inflamed area very carefully. This improves the circulation of both the adjacent territory and the area of the lesion, by the increased movement of the lymphatic and

circulatory flow. Many old sluggish lesions which have almost come to a standstill may be stimulated and encouraged to heal by this increase in blood flow through them.

When complicated by cicatrices, especially those involving the axillary region, it is very essential to begin passive movements such as gentle stretching and mobilization of the scar at the earliest opportunity within the range of safety. Sometimes it is even wise to do this when there is some chance of the scare breaking down, for the resultant contractures and deformity must receive the primary consideration. Such cases as these show the necessity of splinting in abduction during the acute stage, for when contractures due to posture and adductor spasm have the contracting scar tissue added, it becomes almost as difficult to obtain a useful range of shoulder movement, as where the joint itself has a partial ankylosis.

The treatment is practically that described in the paragraph under class A, except that there is added the considerations due to the injury of the bones. The occurrence of contractures is one of the commonest complications accompanying all kinds of lesions of the shoulder area and one of the most difficult to overcome. Like similar conditions at the knee and ankle, they are a heavy burden to the technician, and in eighty per cent of all cases have been occasioned by improper surgical care.

With injuries involving loss of substance, for instance, the head of the humerus with flail condition following, the treatment as regards massage and hydrotherapy is about as described for the usual fracture cases when not complicated by infection. The exercise phase of the treatment, however, need very careful consideration. The chief objects sought are: the taking up of sufficient muscular slack to approximate the upper end of the humerus to the glenoid and the prevention of adduction contractures. A moderate abduction splint should be worn long enough to obtain the maximum of possible muscular strength and mechanical efficiency. The special feature of the splint being support to the elbow in such a way that the arm is raised toward the shoulder, and so that no drag occurs on the flail area. Improper or careless splinting may neutralize the most conscientious effort of the one giving the remedial therapy. The splint should be firmly suspended from both shoulders with a broad chest band and should always be snugly applied. If it sags downs,

the weight of the army and weight of the splint will stretch the affected muscles and do more harm than the exercises can correct.

Exercises chiefly for biceps and coracobrachialis in front, and triceps behind are wanted with only moderate deltoid activity. Pull-up movements designed to close the gap by taking up slack should predominate. If abduction above ninety degrees is given too frequently the upper end of the humerus will be thrust downward below the glenoid, and will thus not rest on a proper fulcrum for efficient use. Care should be used to guard against the constant tendency to elevate the scapula or shrug the shoulder up in doing these exercises. The arm should be returned to its splint always after these exercises in order that the weight of the arm should not hang from the shoulder while fatigued.

ARTHRODESIS

The arm and shoulder should be supported in a carefully applied splint to maintain a constant alignment at the angle desired by the surgeon. This is necessary to prevent premature strain on the line of healing before the scapula is mobilized. Give stimulating treatments as tonic massage, deep petrissage, percussion, that is tapotement, tapping, clapping, hacking, etc., followed by alternate hot and cold applications to the scapular area—relaxing massage with stretching obtained by grasping the scapula with both hands while patient lies prone, making passive movements in all directions, and forcing the edges of the hands under the borders of the scapula to lift it away from the back. Have patient lie close to the edge of the table with arm overhanging it, and make large circumduction movements passively until the scapula obtains the largest possible range of movement. This allows a greater range of action for the arm and makes it possible for the arm in hanging to fall nearer to the side of the body in a shorter time.

SECONDARY CHANGES BELOW THE INJURY

The treatment of trophic and neural conditions in the arm distal to the injury are often as important and frequently more difficult to overcome than the injured area itself. The commonest is the trophic changes evidenced by oedema, shiny skin, reddish, mottled and purplish discoloration, muscle atrophy, disturbed sensation,

arthritis with limitation of motion, and decrease in bone density, due to the atrophy from disuse and circulatory disturbance. Let me emphasize at this point the fact that not enough consideration of the parts distal to the lesion in extremity injuries is ordinarily given by most surgeons, and consequently the degree of later functional efficiency is lessened. As mentioned before these considerations are entirely applicable in a general way to other areas in the body.

Treatment for these conditions should not be left to the post-operative period, or the period following splinting. Wherever and whenever possible, without placing in jeopardy the healing of the injured areas the splint should allow for as much function and treatment of the hand and forearm as possible. Discourage the patient from constantly fussing with hand or fingers. Specify, massage to all areas that can be reached, the definite movements, active or passive, preferably active, for all distal joints. In connection with this let me repeat, in upper arm injuries where possible depleting massage to the scapular, shoulder, and adjacent pectoral area should be adhered in order to invite more rapid return from the venous and lymphatic vessels of the arm.

When the splint can be removed, application of heat, preferably radiant, should be made to the hand and arm. If much pain and neuritis is present, begin with submergence in a hot arm bath, still or circulating, followed by three to five movements of each joint through as complete a range as possible without pain, then give active muscle training, never to a point of fatigue, followed by a good depleting and tonic massage. As quickly as the local condition will permit, begin active movements entirely. Use hand grip machine, pulley weights, manual resistive work, etc., and curative work with tools.

D. PARALYSIS

The most essential factors in the treatment of arm paralysis of either the spastic or flaccid type in the order of importance is, physiological rest obtained by means of rest splints, next supervised muscle training and massage, hydrotherapy, and electrotherapy. The rest splint can be one of several types. The essential features of it should be the control of the position of the arm and shoulder. The arm should be in abduction about twenty degress forward of the lateral plane of the shoulder girdle and rotated outward to

overcome any inward rotation. The forearm in supination, wrist in extension and fingers in accordance with their deformity.

The purpose of the splint in the spastic cases is to assist in overcoming the deformity by preventing the assumption of faulty position caused by the overaction of the spastic group. This group is usually arm adductors, inward rotators, elbow flexors, pronators of forearm, wrist and finger flexors. In the flaccid types its use is chiefly to prevent the weight of the arm from hanging on the weakened shoulder girdle muscles and to prevent the formation of contractures in the unopposed groups.

According to rules laid down by Sir Robert Jones, the part should never be allowed to assume the faulty posture even once during the period of treatment, and if the splint is removed at night the arm should still be kept in abduction. In the muscle training for all shoulder and arm conditions where it is desired to tone up abductors and overcome adductor overaction or contracture, one important rule can be laid down, i. e., never tell the patient to raise the arm and never use the word "up" in this connection, always say "out." There are two reasons for this. First, the moment the patient thinks "up" the shoulder elevators (levator anguli scapulae and trapezius) act. This raises the shoulder girdle and increases the adduction, pointing the tip of the shoulder and thus increasing the amount of friction that the weak deltoid must overcome. Second, according to a physiologic law in muscular activity in order that a muscle or group of muscles can act in a given direction, their opponents must correspondingly "let go." If it is desired to obtain abduction, the stimulus should be "out," and then the contracted or overacting pectorals and teres will let go—thus allowing a wider angle of abduction. This they will not do if the stimulus word is "up" or "raise." In fact any strong effort to raise the arm raises the shoulder, and in spastics especially, tightens the adductors.

There is also in this connection another important point which is seldom appreciated, namely, the necessity of disassociating the action of the arm adductors and the scapular adductors which act synergistically in all adduction movements. Consequently, when a range of pure arm abduction is desired the scapula must be prevented from moving outward and hence we must obtain strong action of the rhombodei, which adduct the scapula, while at the same time the supra spinatus and deltoid are stimulated to obtain the arm

abduction. This is best accomplished in the supine position in which the body weight aids materially in obtaining scapular fixation. The assistant should stand at the end of the table, using one hand on the top of the shoulder to prevent shoulder elevation, and with the other assisting the weak arm in abduction or to continue passive stretching of the adductors. The lying position is also best for overcoming the inward rotation deformity, as the body cannot so readily be moved forward in the effort to slack off the stretching.

The inhibitory spasm, which is stimulated by pain or fear of pain, is more easily overcome in the supine position and the patient tends to localize the movements more and not to call into action other large body groups, so frequently seen in the profuse overaction of many groups in the spastics whenever an added effort is made to increase the movement of even a small hand or arm group.

The fatigue which is so easily produced in the spastic is avoided for a longer period in this position, and static faults are minimized. The reduction of the fatigue factor is very essential, because the toxemia produced by fatigue has a stimulating action on the susceptible and easily irritated cortex. All muscle exercises should be slow, deliberate, and definite with just sufficient strength to make a controlled movement with at the start only a short range.

While the director gently stimulates the patient to make the desired movement, she assists passively and adds a cautious amount of stretching in the direction of the motion, desisting as soon as spasm of the opponent muscles appears. The exercise of each part should not be repeated more than once or twice before changing to another part, as from one arm to the other, or to a leg or foot or from hand to shoulder, etc., thus keeping down the overstrain incident to the effort.

Muscle training should, if possible, always be supervised and given by a trained physical director, but in the absence of one, the nurse or mother or other attendant should be instructed in giving certain exercises and be cautioned in regard to the range, strength and duration and number of each movement. In this connection we have found it useful to guide them by telling them not to give any exercise which does not correspond to one of four words, i. e., out, over, up, or back. Exercise in a warm bath if possible, or right

after one, is found to be of greatest assistance in all forms of the hypertension, overacting group.

We have not seen any good from electrical or vibratory treatment in this class of cases which could not have resulted equally well from massage and muscle education.

In the flaccid type of paralysis, like infantile paralysis, the same rules hold good with the exception that passive stretching is only added when there is overaction or contracture of opponent muscles. The unopposed or weaker muscles should be exercised in a partial arc and never be carried back far enough to stretch the weaker groups. For instance, given a weak triceps—only flex the elbow enough to take up the maximum slack in the triceps, but do not flex beyond this point or the stretching will undo all the benefit gained by previous rest and treatment.

MASSAGE

In the flaccid cases the massage should be given following a short baking and should be a very light petrissage and stripping, in other words, moderately tonic except over the overaction or contracted groups. In the spastic cases especially, warning should be given not to use general movements. Two types of massage are needed; stroking sedative movements with passive stretching on the overacting spastic groups, followed by a light kneading and pinching over the weak opponents. This point in technic is seldom appreciated even by operators who are supposed to be qualified, and their efforts may wholly nullify the good which they might have accomplished if they had not given the usual general tonic motions. Hypertonic muscles need no toning up.

One more word regarding the general handling of these cases. As in all therapeutics the personality of the therapist goes a long way toward gaining succcess, especially in cases having painful conditions to overcome. The ability of the technician to understand the psychological conditions involved, is in many cases absolutely essential to its successful conclusion. For illustration, a high strung, breezy, talkative individual, with loud, or unpleasant voice, or who makes quick erratic movements, is by no means the type of person to handle a spastic child or a worn down irritable hospitalized adult.

The Role of Physiotherapy in Bone Lesions

By DR. THEODORE A. WILLIS, Cleveland, Ohio

FROM the viewpoint of the physiotherapist, but a limited number of bone lesions are amenable to treatment. There are, however, various conditions in which bone changes play an important part, which respond readily to physical measures. Granting that the object of treatment is the restoration of normal function to a pathologic part, what can massage, exercises and like methods accomplish in restoring normal function to pathologic bone? To better come to a conclusion in this regard it will be well to review briefly the generally accepted facts in regard to development and growth of bone.

Bone is a connective tissue characterized by the intercellular deposit of lime salts. Extraction of these with acids leaves a reticulum of tough fibrinous connective tissue and cells. The mineral salts then supply to bone its character of rigidity, upon which its function of mechanical support depends. The greatest strength from the minimum of material is obtained in the long bones by arrangement in the form of hollow cylinders, and in the flat bones of two plates separated by a less dense layer.

Bone is a living tissue. Its nutriment is obtained by way of the blood stream which gains entrance by two routes; the nutrient vessels, which enter directly to the interior of the bone, and the smaller vessels, which enter irregularly from the periosteum and endosteum. In both routes the vessels before entering the bone lie in the fasciae between the adjacent muscles, or between the muscles and the bone. Activity of these muscles, has a direct mechanical stimulating effect upon the circulation through the vessels. Conversely, loss of muscle tone through disuse, paralysis or other cause has the opposite effect upon the circulation.

Increase in length of long bones takes place at either end from the epiphyses or centers of growth, but much more rapidly at one end than at the other. In the lower extremities the more rapid growth is from the epiphyses related to the knee joints. In the upper extremities from those distant from the elbows. Increase in diameter is accomplished by a laying down of new bone beneath the periosteum. The marrow cavity is enlarged by absorbtion of bone substance beneath the endosteum. As growth takes place bone is

moulded by the mechanical stresses and pressures of the surrounding structures. Its ultimate configuration is the resultant of the opposing forces of growth, which tends to increase in all directions, and of function, which is irregular in its influence, pulling here and pressing there. When either of these forces is disturbed there results a departure from the normal development, which is known as a deformity. This may be either of gross appearance or of internal structure only. Though the former type cannot be "rubbed away," restoration to normal of those factors which originally determined the form of the bone may produce marked corrective changes.

Response of bone to an irritant of any type can be expressed in but a limited manner. This may be by a change in lime content, either increase or decrease, or by production or destruction of bone tissue. These changes are demonstrable by X-ray, but the X-ray cannot determine the type of irritant concerned in the process.

The above facts form the basis for the use of physiotherapy in bone lesions. In few, if any of these is the pathology confined to the osseus tissue alone. In none can treatment be administered directly and exclusively to the bone. In fractures, which form a large proportion of the bone lesions coming to the physiotherapist, there is necessarily an injury to the surrounding tissues with hemorrhage and scar formation, as well as injury to the bone. Atrophic lesions of the muscles are accompanied by atrophy of the bone, and in rickets the exaggerated vascularity of the bones is coincident with passive congestion and relaxation of the skin, mucosae and glandular structures.

Proper union of the fragments of a fractured bone necessitates immobilization of the limb for an extensive period of time. The lack of muscle function, due to the immobilization, results in loss of muscle tone, atrophy of muscle and bone and stiffening of the joint structures. Use of immobilizing apparatus permitting access to the part for massage and early mobilization has been of such definite benefit in avoiding these undesirable results and thereby shortening the period of disability in fracture work that in the modern hospital the physiotherapist has become a necessary adjunct to the fracture ward.

Infantile paralysis, though primarily a disease of the nervous system, results in atrophy of the bone as well as of soft structures. The paralyzed limb lags behind its fellow in growth. It has been

noted that when those muscles most closely related to the extraosseus course of the nutrient arteries are paralyzed, the delay in growth of the limb is most marked. The loss in length of the limb is of course of major importance in determining the ultimate disability of the patient, and is dependent upon the lack of bone growth. If physiotherapy can substitute to some extent for loss of muscle tone and improve the circulation to the bone, its growth can be definitely encouraged and the deformity prevented.

Rachitic bone resembles an exaggeration of the vascular stage of normal bone development. It is characterized by lack of proper lime deposit in the intercellular structure, resulting in mushrooming of the extremities and distortion of the shafts. In addition to the bone changes there occurs loss of tone in both voluntary and involuntary muscles, with consequent circulatory changes in the soft structures. The entire picture is one of passive congestion. Recovery is dependent upon, first, the provision of the required mineral salts, and second, ability of the cells to utilize them. These factors being supplied, recovery can be hastened by physiotherapeutic measures tending to stimulate metabolic processes in general.

As shown by X-ray of convalescent rachitic bones, there is first an increased deposit of lime at the epiphyses, then beneath the periosteum along the shaft. In case of bowing of the shaft of a long bone, the increased lime deposit is particularly along the concave aspect of the curve. It is upon this portion of the bone that the greatest stress of weight bearing falls. This mechanical stimulus hastens the lime deposit locally and the concavity is gradually filled in. This is the natural method of cure of rachitic bowlegs and knock knees. Physiotherapy not only serves to increase the circulatory tone, but offers a method of artificial stimulation to lime deposit locally. A similar process takes place following fracture with malunion. The overlapping as shown by X-ray often disappears entirely in a young subject following a few months of active function of the limb. Such a correction is accomplished by the throwing out of new bone to bolster up a weak union. The bolstering occurs along the mesial line, where strain is greatest and the lateral portions being free from strain, are absorbed.

These are the bone lesions which are particularly amenable to treatment by physical means. Such measures are contraindicated in acute and chronic pyogenic infections, syphilis, and neoplas-

tic conditions. Tuberculous bone lesions may benefit from measures which improve the general metabolism, or which increase the local blood supply to the part. Bone lesions involving joints are of too great importance to be considered in the present paper.

Lorena I. Degner was killed in an automobile accident in July near Eugene, Oregon. We deeply regret the loss of one of our members.

Notice

The New York School of Physiotherapy, Inc., has been moved from 616 Madison Avenue to more commodious quarters in the Grand Central Terminal Building, 100 East 45th St., New York.

S. O. S.

Dr. Guy A. Caldwell, Shrevesport, La., has need of an experienced physiotherapist in his office. He is willing to pay $150 a month for *experienced help*.

Physiotherapist of five years' experience in U. S. Government Service wishes a position in a civilian clinic, hospital or a doctor's office. Reference furnished. Inquire of the Secretary.

Treatment of Foot Strain Following Fracture of Lower Leg

By S. L. OSBORNE, B. P. E., Head of Department of Physiotherapy, Oregon State Industrial Accident Commission.

A GREAT deal of disability and discomfort will often follow a fracture of the lower leg, and will continue long after the bones have united. And, unless there is a "tender" callous the pain is usually quite removed from the site of fracture. The ankle and foot are the seat of trouble. This is explained by the simple term of "foot strain"; but the simple foot strain is often quite a complicated symptom for treatment.

Foot strain may be due to fracture deformities, such as angulation at site of fracture, rotation outward, or widening of the mortise at the sub-astragaloid joint. The most common and ever present cause, however, is due to muscular atrophy, the loss of muscular

tonicity and impaired function. These symptoms are caused largely thru the application of plaster casts and enforced rest of the leg and foot over long periods of time.

It is usual to a greater or lesser degree for the joints proximal to a fracture to meet with varying degrees of trauma. This is usually over looked or lost sight of owing to the greater injury and, of course, results in the inevitable fibrous adhesions forming in the region of the sub-astragaloid and medial tarsal joints, inter-articular thickening, and also in retraction of the soft tissues. Another very disabling condition is the contracted tendon of Achilles which is frequently found upon removal of the cast when the foot has not been placed in the correct dorsi-flexed position. Then, again it is a common error for many surgeons to fail to instruct their patients as to suitable foot wear when beginning weight bearing. It is not an unusual experience to see a patient bearing weight with the foot in a soft carpet slipper giving no support at all to the much weakened musculature. A good "Munson" last will often go a very long way toward solving many "foot strain" problems.

Treatment consisting of radiant heat or contrast baths benefits many of these cases. The circulation of the part treated is greatly stimulated, absorption of edema should be hastened, nutrition of all the soft structures should be improved and muscular tonicity regained. Active exercises should then be given to strengthen the weakened and atrophied group of foot muscles. Special attention should be given the foot adductors and the long extensors of the toes. First the exercises are done by the patient sitting with the leg extended in front and the heel free from any obstruction. The muscular re-education must be carefully supervised at the beginning or faulty movements will result. When sufficient progress has been made weight bearing, exercises may be given and the patient taught how to use the foot correctly while walking. In our own clinic we follow very largely the exercises prescribed by Dr. R. T. McKenzie in his valuable book "Exercise in Education and Medicine."

When the joints are limited in their range of movements by fibrous adhesions, then forcible passive movements will often prove beneficial. These movements as a general rule should be kept within the patient's own limits of pain and never given unless under the advice of the patient's surgeon. Resistive exercises are of special

benefit to the joints. The resistance given takes the place of the antagonistic muscle group and this tends to reduce inter-articular pressure.

The preceding methods are not new but have been used for many years by people employing physical therapeutic measures, and have met with varying degrees of success. Complete success, however, will often fail unless some mechanical aid or brace is applied which will be continually used except during the period of massage and exercise treatment. The purpose of such an aid should not be to weaken, but to place already weakened muscles and ligaments in a position of rest so that healing may more readily and rapidly take place.

A patient bearing weight on his foot for the first time after a long period of inactivity should never be allowed to use anything but a well fitting shoe. It is very important that the relaxed and weakened muscles have this necessary support. Frequently the patient will say a shoe cannot be worn because of swelling. This problem can often be overcome if the patient is told to put the shoe on when he first arises in the morning as the foot in all probability will be nearly free of swelling.

When the foot has a tendency to pronate and a good deal of strain is thrown upon the anterior annular ligament, a very effective brace can be secured by means of a figure of eight adhesive strap, so placed as to invert the foot, but in strapping the ankle care should be taken to have the strap pass below the malleoli. Another effective brace is secured by means of a leather insole upon which are sewn pieces of felt in such a way as to give a firm and yet elastic support to the muscles and ligaments forming the longitudinal arch. This frequently gives instant relief. Very often comfort can be secured by the application of properly shaped felt pads to the arch and held in place by adhesive straps. Raising the inner border of the heel about one-fourth inch usually affords great comfort to the pronated foot.

Probably the only sure way to secure relief when the weight bearing surface of the foot is faulty, is by means of a properly prepared metal foot plate. The term foot plate is used, and not arch support, because the fundamental idea is not to support the arch but to distribute the weight bearing surface of the foot more evenly. First, it is necessary to make a plaster mould of the foot which in

turn must be trimmed to meet the needs of the patient. The foot plate is then made from the corrected mould.

Metatarsalgia is a very common ailment and is often the result of carelessness in foot wear after a long period of inactivity. A metatarsal pad of felt cut in a semilunar shape placed just below the heads of the metatarsal bones is an excellent method of treatment. The pad can be held in place by means of adhesive tape.

For the sub-astragaloid joint we have found that the application of a leather anklet enables the patient to walk without much discomfort because it gives support to the ankle joint on lateral motion. The leather anklet is moulded over a plaster model of the patient's ankle and foot and laced similar to a shoe.

The contracted tendo-Achilles is always a source of great disability. Stretching of the tendon of Achilles is secured by means of a board placed across the plantar surface of the foot and by this method leverage is only limited by the patient's resistance to pain. However, there is seldom much gained in greatly contracted cases by these conservative methods. The apparent gain in dorsi-flexion is not due altogether to stretching of the tendon of Achilles, but to a greater range in the medial tarsal joints. Temporary relief, however, can always be gained by applying a felt pad of the necessary thickness in the heel of the shoe. It is my opinion that too much valuable time is lost by such methods. Surgical interference by means of a tenotomy is the best and most economical method.

The foregoing methods have been used very successfully in our Physiotherapy clinic where we have large numbers of fracture cases reporting daily for treatment. The clinic is maintained and supported by the State Industrial Accident Commission of the State of Oregon, for workmen injured in industrial vocations. Many of the men come from the logging industries and it is consequently very essential that they are discharged with good serviceable feet to meet the hazardous demands of their work.

The heights by great men reached and kept
Were not attained by sudden flight
But they, while their companions slept.
Were toiling upward in the night—*Longfellow.*

Membership Blank

Name .....

Permanent Address .....

Present Address .....

Preliminary Education .....

.....

.....

Professional Training with dates .....

.....

.....

.....

Experience with dates .....

.....

.....

.....

Present occupation .....

Names of references with addresses.

(1) A former employer, a doctor preferably.

Name .....

Address .....

(2) A woman to whom you have been known for at least five years.

Name .....

Addresses .....

Please do not pay dues until notified of acceptance.

Applicants will please return application blanks to the Secretary.

Physiotherapy Apparatus

High Frequency Transformers

The Morse Wave Generator

Roentgen Ray Apparatus

Alpine Sun and Kromayer
Ultra Violet Ray Lamps

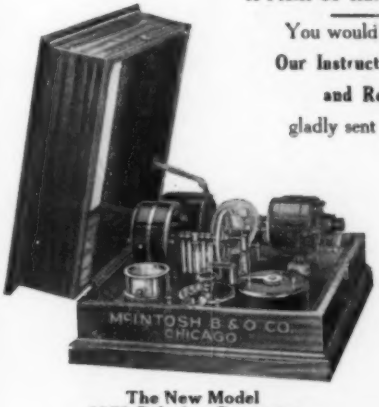
General X-Ray Company

420 Boylston Street
BOSTON

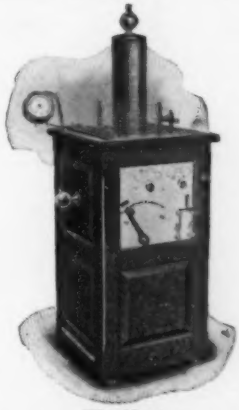
212 E. 23d Street
NEW YORK

A PAIR OF RESULT GETTERS

You would enjoy using
Our Instructive Bulletins
and Reprints
gladly sent on request



The New Model
1058 Polysine Generator



The Hogan
High Frequency Apparatus

McINTOSH ELECTRICAL CORPORATION

Successors to McIntosh Battery & Optical Co., Established 1879

Main Office and Factory, 223-233 N. California Ave., Chicago, Ill.

Gentlemen: — Please send Special Literature and Reprints with full details regarding

the..... to .....

Address.....

Equipment of Proven Efficiency

For nearly thirty years Victor Physical Therapy apparatus has served an important role in the advance of this now generally accepted branch of therapy.

Those who were identified with the work in the Army, Navy or Public Health, have seen, have used Victor apparatus, and know that it is scientifically designed to deliver the various modalities in their true form. It proved itself in quality and durability.

Careful research, in co-operation with the profession, to keep Victor apparatus abreast of present day requirements and in view of future requirements, is unceasing. It is simply following out the Victor policy of these many years standing—to offer only that than which there is none better.

Victor X-Ray Corporation

General Offices and Factory

236 South Robey St. Chicago

Sales Offices and Service Stations in all the Principal Cities

New York School of Physiotherapy

Offers a practical and theoretical course in Massage, Medical and Hygienic Gymnastics, Electro-and Hydrotherapy. Strong Faculty American and Swedish Instructors.

Diploma, Patients and Positions Secured.

Address

CARL S. HALL, Director

100 East 45th St., New York City

New Haven School of Physiotherapy

FIFTH YEAR

Physicians. Individual instruction to graduates in medicine. Courses yearly to suit individual needs.

Technicians. Two courses yearly, two months each in theory and practice of Physiotherapy, preparatory to positions as physicians' assistants, in hospital departments, or for Civil Service. Post-graduate courses for ex-service aides.

For further information address

HARRY EATON STEWART, M. D.
Director
420 Temple St. : New Haven, Conn.

THE BROOKLINE PRINT